1. (Amended) Method for the microbiological production of α-L-aspartyl-L-phenylalanine (Asp-Phe) from the substrates L-aspartic acid (L-Asp) and L-phenylalanine (L-Phe) wherein the substrates are contacted, in the presence of an effective amount of adenosine-triphosphate (ATP), with a non-ribosomal dipeptide synthetase comprising two minimal modules connected by one condensation domain, wherein the N-terminal module of these modules is recognising L-aspartic acid and the C-terminal module of these modules is recognising L-phenylalanine and is covalently bound at its N-terminal end to the condensation domain, and wherein each of these minimal modules is composed of an adenylation domain and a 4'-phosphopantetheinyl cofactor containing thiolation domain, and that the α-L-aspartyl-L-phenylalanine (Asp-Phe) formed is recovered.

2. (Amended) Method for the production of Asp-Phe according to claim 1, wherein the condensation domain in the dipeptide synthetase is connected to both minimal modules in such way that it is also covalently bound to the module recognising L-aspartic acid.

3. (Amended) Method for the production of Asp-Phe according to claim 1, further comprising a thioesterase-like releasing factor for the Asp-Phe formed on the dipeptide synthetase.

4. (Amended) Method for the production of Asp-Phe according to claim 1, wherein the thioesterase-like releasing factor forms an integrated domain of the dipeptide synthetase at the C-terminus thereof.

5. (Amended) Method for the production of Asp-Phe according to claim 1, wherein a non-integrated protein with thioesterase Type-II-like activity is further present together with the dipeptide synthetase.

6. (Amended) Method for the production of Asp-Phe according to claim 5, wherein the dipeptide synthetase is present in living cell-material of a micro-organism; glucose, L-Asp, L-Phe, or mixtures thereof are being fed to said fermentor; and the Asp-Phe formed is recovered.

7. (Amended) Method for the production of Asp-Phe according to claim 6, wherein the micro-organism is first grown in a fermentor to reach a predetermined cell density before the expression of the Asp-Phe dipeptide synthetase is switched on, and feeding of the glucose, L-Asp, L-Phe, or mixtures thereof for the synthesis of the Asp-Phe dipeptide is started.

8. (Amended) Method for the production of Asp-Phe according to claim 7, wherein the micro-organism is an L-phenylalanine producing micro-organism; and only glucose and L-Asp are being fed.

9. (Amended) Method for the production of Asp-Phe according to claim 8, wherein the micro-organism is an *Escherichia* or *Bacillus* species.

10. (Amended) Method for the production of Asp-Phe according to claim 6, wherein the micro-organism used is a strain having reduced protease activity for Asp-Phe or having no protease activity towards Asp-Phe.

11. (Amended) Method for the production of Asp-Phe according to claim 1, wherein the production of Asp-Phe is carried out *in vitro* in an enzyme reactor, while ATP is supplied, L-Asp, L-Phe, or mixtures thereof is being fed, and the Asp-Phe formed is recovered.

12. (Amended) Method for the production of Asp-Phe according to claim 11, wherein the

supply of ATP is provided in part by an in situ ATP-regenerating system.

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13. (Amended) Method for the production of Asp-Phe according to claim 12, wherein the ATP-regenerating system is present in a permeabilised micro-organism.

14. (Amended) A DNA fragment or a combination of DNA fragments coding for a non-ribosomal Asp-Phe dipeptide synthetase, said synthetase comprises two minimal modules connected by one condensation domain, wherein the N-terminal module of these modules is recognising L-aspartic acid, and the C-terminal module of these modules is recognising L-phenylalanine; and is covalently bound at its N-terminal end to the condensation domain, and wherein each of said minimal modules is composed of an adenylation domain and a 4'-phosphopantetheinyl cofactor containing thiolation domain.

15. (Amended) A DNA fragment coding for an Asp-Phe dipeptide synthetase according to claim 14, wherein the condensation domain in the encoded dipeptide synthetase is connected to both minimal modules in such way that it is also covalently bound to the module recognising L-aspartic acid.

16. (Amended) A DNA fragment or a combination of DNA fragments according to claim 14, wherein the DNA fragment or the combination of DNA fragments encoding the dipeptide synthetase also code for a releasing factor for the Asp-Phe formed on that dipeptide synthetase.

17. (Amended) A DNA fragment or a combination of DNA fragments according to claim 16, wherein the thioesterase-like releasing factor forms an integrated domain of the dipeptide synthetase at the C-terminus thereof.

18. (Amended) A DNA fragment or a combination of DNA fragments according to claim 14, wherein said DNA fragment or a combination of DNA fragments also code for a non-integrated protein with thioesterase Type-II-like activity.

19. (Amended) A recombinant micro-organism containing a DNA fragment or a combination of DNA fragments according to claim 14.

20. (Amended) A micro-organism according to claim 19, wherein the micro-organism is capable of producing L-Asp, L-Phe, or mixtures thereof.

21. (Amended) A micro-organism according to claim 25, wherein the micro-organism is an *Escherichia coli* or *Bacillus* species.

22. (Amended) Asp-Phe dipeptide synthetase comprising two minimal modules connected by one condensation domain, wherein the N-terminal module of these modules is recognising L-aspartic acid and the C-terminal module of these modules is recognising L-phenylalanine and is covalently bound at its N-terminal end to the condensation domain, and wherein each of these minimal modules is composed of an adenylation domain and a 4'-phosphopantetheinyl cofactor containing thiolation domain.

23. (Amended) Asp-Phe dipeptide synthetase according to claim 22, wherein the condensation domain in the dipeptide synthetase is connected to both minimal modules in such way that it is also covalently bound to the module recognising L-aspartic acid.

24. (Amended) Asp-Phe dipeptide synthetase according to claim 22, wherein the dipeptide synthetase also comprises a releasing factor for the Asp-Phe formed on that dipeptide synthetase.

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25. (Amended) Asp-Phe dipeptide synthetase according to claim 24, wherein the releasing factor is a protein which shows thioesterase-like functions and forms an integrated domain of the dipeptide synthetase at its C-terminus.